

# PATENT COOPERATION TREATY

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## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 154639-9dk	<b>FOR FURTHER ACTION</b> See Form PCT/IPEA/416	
International application No. PCT/IL2004/000590	International filing date (day/month/year) 01.07.2004	Priority date (day/month/year) 02.07.2003
International Patent Classification (IPC) or national classification and IPC G01S13/87, F41G5/08, F41G7/30		
Applicant ELTA SYSTEMS LTD.		
1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36. 2. This REPORT consists of a total of 12 sheets, including this cover sheet. 3. This report is also accompanied by ANNEXES, comprising: a. <input checked="" type="checkbox"/> sent to the applicant and to the International Bureau a total of 2 sheets, as follows: <input checked="" type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions). <input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box. b. <input type="checkbox"/> (sent to the International Bureau only) a total of (Indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).		
4. This report contains indications relating to the following items: <input checked="" type="checkbox"/> Box No. I   Basis of the opinion <input type="checkbox"/> Box No. II   Priority <input type="checkbox"/> Box No. III   Non-establishment of opinion with regard to novelty, inventive step and industrial applicability <input checked="" type="checkbox"/> Box No. IV   Lack of unity of invention <input checked="" type="checkbox"/> Box No. V   Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement <input type="checkbox"/> Box No. VI   Certain documents cited <input type="checkbox"/> Box No. VII   Certain defects in the international application <input checked="" type="checkbox"/> Box No. VIII   Certain observations on the international application		
Date of submission of the demand  02.05.2005	Date of completion of this report  04.07.2005	
Name and mailing address of the international preliminary examining authority:   European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016	Authorized Officer  Blondel, F  Telephone No. +31 70 340-2611	



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**Box No. I Basis of the report**

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1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
- ☐ This report is based on translations from the original language into the following language , which is the language of a translation furnished for the purposes of:
- ☐ international search (under Rules 12.3 and 23.1(b))
  - ☐ publication of the international application (under Rule 12.4)
  - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)
2. With regard to the **elements\*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

**Description, Pages**

1-27 as originally filed

**Claims, Numbers**

1-4 received on 02.05.2005 with letter of 01.05.2005

**Drawings, Figures**

1-7 as originally filed

☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing

3. ☐ The amendments have resulted in the cancellation of:
- ☐ the description, pages
  - ☐ the claims, Nos.
  - ☐ the drawings, sheets/figs
  - ☐ the sequence listing (*specify*):
  - ☐ any table(s) related to sequence listing (*specify*):
4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
- ☐ the description, pages
  - ☐ the claims, Nos.
  - ☐ the drawings, sheets/figs
  - ☐ the sequence listing (*specify*):
  - ☐ any table(s) related to sequence listing (*specify*):

\* If item 4 applies, some or all of these sheets may be marked "superseded."

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**Box No. IV Lack of unity of invention**

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1. ☒ In response to the invitation to restrict or pay additional fees, the applicant has:
- ☐ restricted the claims.
  - ☐ paid additional fees.
  - ☐ paid additional fees under protest.
  - ☒ neither restricted nor paid additional fees.
2. ☐ This Authority found that the requirement of unity of invention is not complied with and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees.
3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is
- ☐ complied with.
  - ☒ not complied with for the following reasons:  
**see separate sheet**
4. Consequently, this report has been established in respect of the following parts of the international application:
- ☐ all parts.
  - ☒ the parts relating to claims Nos. 1 - 3 .

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**Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

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1. Statement

Novelty (N)	Yes: Claims	2
	No: Claims	1, 3
Inventive step (IS)	Yes: Claims	2
	No: Claims	1, 3
Industrial applicability (IA)	Yes: Claims	1 - 3
	No: Claims	None

2. Citations and explanations (Rule 70.7):

**see separate sheet**

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**Box No. VIII Certain observations on the international application**

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The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

**see separate sheet**

**Re Item IV**

**Lack of unity of invention**

This Authority considers that there are two inventions covered by the claims indicated as follows:

- 1: Claims 1, 2 and 3 directed to a synchronized network of search and track radars
- 2: Claims 4 directed to a rolling interceptor devoid of inertial sensor but with circumferential communication antennae

The International Searching Authority (ISA) has carried out a partial search which relates to invention 1 mentioned above.

The applicant has therefore been invited to pay one additional fee, as provided by article 17 (3) (a) PCT, for the invention 2 as listed hereinabove.

The reason for which the present application has been deemed to contain two inventions which are not linked such as to form one single general inventive concept, as required by rules 13. 1, 13. 2 and 13. 3 PCT are as follows:

Document US 5184137 (see more particularly column 2, line 57 to column 67, line 16; figure 1 to 14), which is referred to as D1 in the following of this communication and which belongs to the prior state of the art and has also been published before the filing date of the priority of this application, discloses (the references in parentheses applying to this document):

a synchronized network of at least three search and track radars (14 A, B, C and D) and associated processing means and communication channel,

said synchronized network comprising explicitly or even implicitly various technical features or elements, which are either identical or similar or even equivalent to each of all the same

technical features or elements belonging to independent synchronized network claim 1 of this application, as claimed in said independent claim 1 of this same application.

In the following an analysis of the different inventions shall be made.

The first additional special technical feature which could possibly be considered as new and involving also an inventive step with respect to the available cited prior art in the first set of claims corresponding to the first invention as listed hereinabove appears to be disclosed in dependent claim 2 which mentions the use of a range triangulation providing accurate target and interceptor position measurements which are assumed not to deteriorate linearly with range.

On the contrary, it appears that independent claim 4 discloses another different invention, namely a rolling interceptor devoid of inertial sensor but with circumferential communication antennae.

Although this application concerns a defence system against aerial targets, it appears that there is no common link between all the claims as filed.

As a matter of fact, the only features common to independent Claims 1, 3 and 4 are:

an interceptor receiving maneuvering commands from a command transmitter,

all features which are obviously already very well known (see for instance US 5184137).

As all these common features are already known from the prior state of the art, it appears accordingly that there is no single general inventive concept common to these independent claims and therefore that this application does not comply with the requirements of rules 13. 1 and 13. 2 PCT.

In order to be allowed to be considered as unitary, an international application shall relate to one invention only or to a group of inventions so linked as to form a single general inventive concept (rule 13. 1: "requirement of unity of invention").

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When a group of inventions is claimed in one and the same international application, the requirement of unity of invention as referred to by rule 13. 1 shall be fulfilled only when there is a technical relationship among those inventions involving one or more of the same or corresponding special technical features; this expression "special technical features" shall mean those technical features that define a contribution which each of the claimed inventions, considered as a whole, makes over the prior art, which very means that they must be at least new and, obviously also, involve an inventive step, as stated by rule 13. 2.

In this present case, it appears that the different inventions exhibit several different sets of special technical features aimed to solve several different technical problems and that the common features of these different inventions cannot by any way be considered as defining a contribution over the prior art, as being already very well known from this prior art (see for instance US 5184137).

Therefore, the different inventions are not linked by any common or corresponding Special Technical Feature within the meaning of rule 13. 2 PCT, and define several different inventions non linked by a single general inventive concept. This application, hence does not meet the requirements of Unity of Invention as defined in rule 13. 1 and 13. 2 PCT.

The application has been divided into the above (groups of) inventions which individually are considered to meet the requirement of unity. If additional fees are paid for (one or more of) the, as yet, unsearched invention(s), the subsequent search(es) might reveal prior art which leads to a finding of lack of unity a posteriori within (one or more of) the, as yet, unsearched invention(s). Should this be the case, as a rule, no further invitation to pay additional fees will be issued.

Only the first identified invention in each group of inventions, for which additional search fees have been paid in due time and which subsequently is considered to lack unity, will be searched.

**Re Item V**

**Reasoned statement with regard to novelty, inventive step or industrial applicability;  
citations and explanations supporting such statement**

1-

The application does not meet the requirements of Article 6 PCT, because independent claim 1 is not clear.

Independent claim 1 is not that clear for it appears that this independent claim has been drafted in no less than nine separate successive independent sentences, raising some doubt concerning the matter for which protection is sought. As a matter of fact, it is not easy to determine whether this independent claim 1 is limited to just its first sentence or, on the contrary, encompasses all these nine successive independent sentences, among other possible interpretations.

The aforementioned claim therefore lacks conciseness. Moreover, lack of clarity of that claim arises, since the plurality of independent sentences makes it difficult, if not impossible, to determine the matter for which protection is sought, and places an undue burden on others seeking to establish the extent of the protection.

In order to overcome this objection, it would appear appropriate to file an amended independent claim 1 drafted in only one sole and single sentence encompassing all the previous nine separate successive independent sentences, linked together in an appropriate way.

2-

Furthermore, the above-mentioned lack of clarity notwithstanding, the subject-matter of independent claim 1 is not new in the sense of Article 33 (2) PCT, and therefore the criteria of Article 33 (1) PCT are not met (confer ut supra).

In case of any doubt remaining in the mind of the applicant and related to the relevance of document D1, he is invited to take into consideration the two cited "Y" documents: FR



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2709835 and US 4442431, which are referred to as D2 and D3 respectively in the following of this communication, as it appears that the combination of the teachings of both documents D2 and D3 demonstrates clearly the lack of any inventive step in the content of independent claim 1 of this application.

3-

Independent claim 1 is not in the two-part form in accordance with Rule 6. 3 (b) PCT, which in the present case would be appropriate, with those features known in combination from the prior art (document US 5184137) being placed in the preamble (Rule 6. 3 (b) (i) PCT) and with the remaining features being included in the characterising part (Rule 6. 3 (b) (ii) PCT).

4-

Although claims 1 and 3 have been drafted as separate independent network claim on the one hand, and as separate independent system claim on the other hand, they appear to relate effectively to the same underlying concept and to differ from each other only with regard to the definition of the underlying concept for which protection is sought and in respect of the terminology used for the features of that underlying concept. The aforementioned claims therefore lack conciseness and as such do not meet the requirements of Article 6 PCT.

**Re Item VIII**

**Certain observations on the international application**

In particular the attention of the applicant is drawn to the fact that, contrary to the appearances, document D1 does disclose effectively and at least implicitly the following features, namely:

"the synchronized measurements are combined by range triangulation to provide accurate target and interceptor position measurements irrespective of the angular measurement accuracy of each radar".

As a matter of fact, the radar apparatus as described in document D1 is fitted out with an array antenna, which, like any other array antenna associated with such a radar apparatus, works consistently with and according to a very well known basic principle, which, in turn, can perfectly be considered as mathematically and physically equivalent to the principle of so called "range triangulation".

As a consequence, it appears that this last argument proves beyond any reasonable doubt that document D1 discloses indeed all the features of independent synchronized network claim 1 of this application, with the unavoidable conclusion that said independent synchronized network claim 1 of said application clearly lacks novelty.

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**CLAIMS:****1. A system comprising:**

a synchronized network of at least three search and track radars and associated processing means and communication channel; the radars are  
5 configured to detect and track at least one target; in response to detected at least one target, at least one interceptor is launched towards said at least one target; the radars are configured to measure and track the at least one target and the at least one interceptor; the target and interceptor ranges are accurately measured by said  
10 at least three radars in the synchronized network, giving rise to synchronized accurate range measurements; the synchronized measurements are combined by range triangulation to provide accurate target and interceptor position measurements irrespective of the angular measurement accuracy of each radar; the processing means are configured to utilize the position measurements to calculate interceptor maneuvers commands required to overcome errors and  
15 bring the interceptor close to the target; the maneuver commands are transmitted to the interceptor using the communication channel; the interceptor is equipped with kill mechanism designed to destroy a target warhead when said interceptor approaches the target.

**2:** The system according to Claim 1, wherein said range triangulation  
20 provides accurate target and interceptor position measurements which do not deteriorate linearly with range and said interceptor does not employ on-board seeker.

**3.** In a system that comprises a synchronized network of at least three  
25 search and track radars and associated processing means and communication channel; the radars are configured to detect and track at least one target; in response to detected at least one target, at least one interceptor is launched towards said at least one target; the radars are configured to measure and track the at least one target and the at least one interceptor; the target and interceptor

- 2 -

ranges are accurately measured by said at least three radars in the synchronized network, giving rise to synchronized accurate range measurements;

5 a processing means associated with said radars configured to combine the synchronized measurements by range triangulation to provide accurate target and interceptor position measurements irrespective of the angular measurement accuracy of each radar; the processing means are configured to utilize the position measurements to calculate interceptor maneuvers commands\_required to overcome errors and bring the interceptor close to the target;

10 4. A rolling interceptor being devoid of inertial roll sensor and equipped with circumferential communication antennae that are configured to receive maneuvering commands from a command transmitter; the interceptor is configured to use said antennae to provide a reference for resolution of the maneuvering commands.